

TRANSLATION

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference TP 036-P-WO	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/CH2004/000644	International filing date (day/month/year) 28.10.2004	Priority date (day/month/year) 08.12.2003	
International Patent Classification (IPC) or national classification and IPC B29C45/54, B29C45/50			
Applicant BÜHLER AG			

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 8 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CH2004/000644

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

 - international search (Rule 12.3 and 23.1(b))
 - publication of the international application (Rule 12.4)
 - international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

the international application as originally filed/furnished

the description:

pages 3-12 as originally filed/furnished
 pages* 1, 2, 2a received by this Authority on 06.06.2005 with telefax

pages* _____ received by this Authority on _____

the claims:

nos. _____ as originally filed/furnished
 nos.* _____ as amended (together with any statement) under Article 19
 nos.* 1-14 received by this Authority on 06.06.2005 with telefax
 nos.* _____ received by this Authority on _____

the drawings:

sheets 1/2, 2/2 as originally filed/furnished
 sheets* _____ received by this Authority on _____
 sheets* _____ received by this Authority on _____

a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. The amendments have resulted in the cancellation of:

the description, pages _____

the claims, nos. _____

the drawings, sheets/figs _____

the sequence listing (*specify*): _____

any table(s) related to sequence listing (*specify*): _____
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

the description, pages _____

the claims, nos. _____

the drawings, sheets/figs _____

the sequence listing (*specify*): _____

any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/CH2004/000644Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1 – 14	YES
	Claims		NO
Inventive step (IS)	Claims	1 – 14	YES
	Claims		NO
Industrial applicability (IA)	Claims	1 – 14	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

(1) This report makes reference to the following documents:

D1: DE 11 77808 B (GEWERKSCHAFT SCHALKER EISENHUETTE) 10 September 1964

D2: EP-A-0 727 303 (EMS-INVENTA AG) 21 August 1996

D3: EP-A-0 881 054 (LURGI ZIMMER AKTIENGESELLSCHAFT) 2 December 1998

D4: DE 101 60 810 A1 (KRAUSS-MAFFEI GMBH) 18 June 2003

D5: VORBERG F: "COMPOUNDIEREN MIT ZWÖELF WELLEN RINGEXTRUDER ZEIGT VORTEILE GEGENÜBER DER DOPPLESCHNECKE" KUNSTSTOFFE, CARL HANSER VERLAG. MÜNCHEN, DE, vol. 90, no. 8, August 2000, pages 60–62, XP000963682 ISSN: 0023-5563

D6: WO 02/36317 A (BUEHLER AG) 10 May 2002

D7: US-A-5 968 429 (TREECE ET AL) 19 October 1999

D8: DE 24 06 569 A1 (CORIMA, S.P.A; CORIMA S.P.A., CEDRATE DI GALLARATE, VARESE) 5 September 1974

D9: DE 12 15 913 B (GEWERKSCHAFT SCHALKER EISENHUETTE) 5 May 1966

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

(2) Independent claims 1 and 9

2.1) Novelty

D3 discloses the use of a multiple-screw extruder for plasticizing and degassing polycondensates (polyester, polyamide and polycarbonate), wherein the molten material leaving the extruder is then fed to an injection molding machine [D3: page 2, lines 43-46; page 3, lines 38-40]. D3 discloses a method of producing injection molded parts made of thermoplastic materials comprising the features (F) of claims 1 and 9:

- F1.1: a step for plasticizing the plastic material by means of a multiple-screw extruder and F9.1: at least one multiple-screw extruder as a plasticizing extruder [see D3: page 2, lines 40-42]
- F1.2: a step for pressing the plasticized plastic material into at least one mold and F9.2: and at least one injection molding mold [see D3: page 3, lines 38-40 in conjunction with figure 1, reference sign 8].

The subject matter of claims 1 and 9 differs from the method and device for plasticizing and injection molding known from D3 by the fact that the plasticization process takes place in a or by means of the multiple-screw extruder having at least three worm shafts arranged on a rim line and tightly intermeshing at least in subregions, and

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that the throughput characteristic number Z of the plasticizing extruder is larger than 800. The subject matter of claim 1 and that of claim 9 are therefore novel (PCT Article 33(2)).

2.2) Inventive step

The problem to be solved by the present invention can be regarded as that of achieving a plasticization process that has improved mixing properties together with high throughput capabilities and short dwell times. The solution to this problem as proposed in claim 1 and claim 9 of the present application involves an inventive step (PCT Article 33(3)) because none of the documents D1 to D9 cited in the search report, either alone or in combination, anticipates or discloses the use of a multiple-screw extruder having at least three worm shafts arranged on a rim line and tightly intermeshing at least in subregions with a throughput characteristic number Z larger than 800.

3) Dependent claims 2 to 8 and 10 to 14

Claims 2 to 8 and 10 to 14 are dependent on claim 1 and claim 9, respectively, and therefore also meet the PCT requirements for novelty and inventive step.